

# Protective and destructive processes of food and nutritional sovereignty and security in the Tirecatinga Indigenous Land, Sapezal, Mato Grosso

*Processos protetores e destrutivos da soberania e segurança alimentar e nutricional na Terra Indígena Tirecatinga, Sapezal, Mato Grosso*

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**ABSTRACT** This article aims to identify the protective and destructive processes of food and nutritional sovereignty and security, from the perspective of the Indigenous peoples of Tirecatinga, an Indigenous land located in the municipality of Sapezal, in the state of Mato Grosso. This qualitative research was based on the theory of social determination proposed by Breilh. Semi-structured interviews and conversation circles with men and women were used, with the theme of territory. Among the results, the food insecurity of these Indigenous peoples, whose lands are surrounded by cotton and soy monocultures, and its most perverse effect, hunger, is evident. The protective processes mentioned include the territory, traditional subsistence practices, social programs, food sharing, the Thutaliñansu organization and financial resources from mechanized farming existing on Indigenous land. The destructive processes are the ineffectiveness of social programs, the construction of hydroelectric plants, mechanized farming, the increase in wild pigs and the aerial spraying of pesticides on crops surrounding Indigenous land. Understanding the protective and destructive processes of food security for the Indigenous peoples of Tirecatinga is essential for the construction of policies that promote the sovereignty and food and nutritional security of these peoples.

**KEYWORDS** Public policies. Indigenous peoples. Food and nutritional security.

**RESUMO** Este artigo tem como objetivo identificar os processos protetores e destrutivos da soberania e segurança alimentar e nutricional, na perspectiva dos povos indígenas de Tirecatinga, terra indígena localizada no município de Sapezal, no estado de Mato Grosso. Trata-se de uma pesquisa qualitativa, fundamentada na teoria da determinação social proposta por Breilh. Utilizaram-se entrevistas semiestruturadas e rodas de conversa com homens e mulheres, tendo por temática o território. Dentre os resultados, evidencia-se a insegurança alimentar desses povos indígenas, cujas terras são cercadas por monoculturas de algodão e soja, e seu efeito mais perverso, a fome. Os processos protetores mencionados incluem o território, as práticas tradicionais de subsistência, os programas sociais, a partilha de alimentos, a organização Thutaliñansu e os recursos financeiros provenientes da lavoura mecanizada na terra indígena. Os processos destrutivos são a não efetividade de programas sociais, a construção de hidrelétricas, a lavoura mecanizada, o aumento do porco-do-mato e a pulverização aérea de agrotóxicos nas lavouras ao redor da terra indígena. Compreender os processos protetores e destrutivos da segurança alimentar dos povos indígenas de Tirecatinga é essencial para a construção de políticas que promovam a soberania e segurança alimentar e nutricional desses povos.

**PALAVRAS-CHAVE** Políticas públicas. Povos indígenas. Segurança alimentar e nutricional.

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## Introduction

In the Brazilian context, Food and Nutritional Security (SAN) is based not only on regular and permanent access to quality food, but also on the promotion of healthy eating practices, respecting cultural diversity and guaranteeing the right to adequate food<sup>1</sup>. Food sovereignty, a term that emerged from social movements, especially Via Campesina, complements and strengthens SAN, insofar as it ensures the right of peoples to decide on their own food systems, defending traditional knowledge, biodiversity, and territories. In this sense, SAN, strengthened by the perspective of food sovereignty, acquires a comprehensive dimension, which is reflected in the discussions promoted in the National Conferences on Indigenous Health.

The conferences recognize the interconnectedness of health, culture, and access to adequate food for indigenous peoples. During these events, the discussion on food security transcends the availability of food, encompassing the understanding that indigenous health is linked to traditional food practices, access to land, and the preservation of their ways of life<sup>2</sup>.

In this context, the study carried out by Verдум<sup>3</sup>, between 1994 and 1995, already showed that hunger and food insecurity manifested themselves with greater intensity in Indigenous Lands (ILs) impacted by infrastructure projects, such as highways, railways, mining, hydroelectric plants, as well as in territories invaded by miners, squatters and loggers.

The I National Survey of Health and Nutrition of Indigenous Peoples, carried out in 2008, reiterated critical problems, such as food insecurity, environmental contamination, increasing urbanization and increased violence. Malnutrition in children under 5 years of age affected about one in three of them, which demonstrated the vulnerability of these peoples<sup>4</sup>.

During Jair Bolsonaro's government (2019-2022), there was a weakening of environmental protection agencies and the rights of

indigenous peoples. This situation generated disastrous consequences, such as increased deforestation in the Amazon, intensive use of natural resources, and the uncontrolled entry of illegal miners and mining companies into indigenous territories. Furthermore, the release of pesticides banned in other countries was authorized, further aggravating the threat to the integrity of these territories and the availability of resources such as water, flora, and fauna<sup>5,6</sup>. The Yanomami and Mundurucu communities were particularly affected by these illegal practices, which represent a threat to the well-being and security of indigenous peoples<sup>5</sup>. It was in this context that the Ministry of Health declared a Public Health Emergency of National Importance (ESPIN) due to the lack of health-care among the Yanomami people in the state of Roraima in January 2023<sup>7</sup>.

Meanwhile, the morbidity and mortality profile deteriorates and becomes more complex; malnutrition, anemia, infectious and parasitic diseases persist, and obesity, diabetes mellitus, and hypertension emerge<sup>6</sup>. Indigenous peoples continue to suffer from the capitalist mode of production and its brutal burden of atrocities. For Iberê<sup>8</sup> and Pessoa et al.<sup>9</sup>, agribusiness stands out as one of the economic activities of Brazil's neo-extractive development model. This model consists of the plunder of large producers and the subjugation of small producers to limited and disadvantageous productivity, reproducing inequality and making survival and the guarantee of food sovereignty impossible<sup>10</sup>.

Since the Green Revolution, agribusiness has adopted the discourse that new technology could feed everyone, using it as an ethical justification for intensifying the exploitation of nature and human labor, with a view to producing surplus value and accumulating capital in an accelerated and unrestricted manner<sup>10,11</sup>.

According to Canuto<sup>12</sup>, agribusiness has promoted the concentration of land and income, causing unemployment, the use of labor analogous to slavery, fostered land grabbing and increased deforestation in the Amazon and

Cerrado, in addition to its negative effects on human health and the trail of violence and conflicts that accompanies it. In the state of Mato Grosso (MT), these effects become more evident. The expansion of agricultural frontiers, driven by monoculture of soy, corn and cotton, has advanced over forest areas, indigenous territories and traditional communities, intensifying socio-environmental conflicts, deforestation and contamination by pesticides, in addition to deepening the social and economic inequalities of the region.

With regard to the advances of this mode of production in the surroundings and in indigenous territories in MT, Souza and Lima, Corrêa and Gugelmin<sup>13</sup> mention that fires and deforestation are related to the opening of new areas destined for the production of commodities and extensive livestock farming. The occupation of land by agribusiness exerts pressure on indigenous territories, intensifying land conflicts and attempts to legalize land usurpation.

Based on the scenario described, the concept of the social determination of disease<sup>14</sup> offers the possibility of analyzing Food and Nutritional Sovereignty and Security (SSAN) as a process of social reproduction that links the socioeconomic, political, and cultural structure with the ways and conditions of life of the group, and the final effects on people.

Thus, research on SSAN in indigenous territories is necessary, since many are isolated by the agricultural cultivation of monocultures, such as the Tirecatinga Indigenous Land, surrounded by cotton and soybean monocultures, characteristic of the economy of the city of Sapezal/MT. In this context, this article aims to analyze the protective and destructive processes of SSAN from the perspective of the indigenous peoples of Tirecatinga.

## Material and methods

This is a qualitative study, with a descriptive and analytical approach, based on the

dialectical method. It was part of a larger project entitled 'From the field to the body', conducted by the working group of the Center for Studies in Environment, Health and Work of the Institute of Collective Health of the Federal University of Mato Grosso (Neast/ISC/UFMT), in partnership with the Native Amazon Operation (Opan).

The study was conducted in the Tirecatinga IL, located in the northwest of the state of Mato Grosso, in the city of Sapezal/MT, in the Cerrado region. This land was demarcated in 1983 and has an area of 130,575 hectares, surrounded by large monoculture farms of soy and cotton, with its geographical boundaries being the Papagaio and Buriti rivers, which make up the Juruena River basin and bathe the region where the Nambikwara, Terena, Paresi, and Manoki peoples live<sup>15</sup>. According to the Brazilian Institute of Geography and Statistics<sup>16</sup>, there are 244 people in the Tirecatinga IL, distributed in 12 villages.

In this article, two data collection techniques were employed: conversation circles and semi-structured interviews. The script for the conversation circles and the interview focused on SSAN and the agribusiness, covering the production, access, and availability of food, environmental transformations, and their effects on the aforementioned items.

Due to the continuation of Ordinance No. 419/2020<sup>17</sup>, which imposed temporary measures to prevent the infection and spread of the new Coronavirus (COVID-19), restricting access to the Tirecatinga IL, the conversation circles were held from April 20 to 23, 2022, at Pousada 3J, located in the municipality of Poconé, 100 km from Cuiabá and approximately 570 km from the Tirecatinga IL. As the matrix project was carried out in partnership with Opan, the organization defined the location for the conversation circles with the indigenous people. It is important to highlight that all sanitary measures to prevent COVID-19 were followed, with activities taking place in a well-ventilated environment, the use of masks, and the availability of hand sanitizer

among participants. Furthermore, the researchers were previously tested and received negative results for COVID-19, ensuring the participation of all participants in the proposed activities.

Regarding the discussion circles, 22 indigenous people from the following villages participated (number of participants in parentheses): Três Jacu (3), Utiariti (4), Novo Encantado (3), Caititu (4), Serra Azul (3), Anchieta (2), and Vale do Buriti (3). Participants in these activities included young people, adults, and the elderly, men and women, invited by local leaders. It is worth noting that the majority of participants were women and young people.

The participants were divided into three heterogeneous groups, defined by lottery for the discussion circle activities. Three discussion circles were held, mediated by two researchers. It is important to highlight that elements of the territory appeared in the dialogues, which demonstrates an inseparability between territory and food for the indigenous people.

With the suspension of Ordinance No. 419/2020<sup>17</sup>, the interviews were conducted in the Tircatinga Indigenous Territory between July 12 and 22, 2023. In total, 13 indigenous people were interviewed, of whom 9 were women. The interviews took place in the homes of the indigenous people, distributed in the following villages: Vale do Buriti (3), Cabeceira do Jabuti (1), Caititu (1), Utiariti (1), Serra Azul (2), Guarantã (3), Novo Horizonte (2).

The conversation circles and interviews were audio-recorded to ensure data accuracy and greater interaction between the researcher and the interviewee. The recordings were transcribed in full and subsequently subjected to analysis based on the theory of social determination<sup>14</sup>, from the perspective of dialectical materialism. According to Breilh<sup>14</sup>, this theory considers reality as a process in constant motion. It is a historicized interpretation, in which structural and social processes are shown to be complex, multidimensional, and interdependent, being made explicit in general, particular, and singular

dimensions. The conditioning factors refer to each time and space.

In the analysis process, the protective and destructive processes of SSAN were manually sought in the transcripts. That is, the processes that favor SSAN in the Tircatinga IL and those that cause deprivation or deterioration of the lives and ways of life of the indigenous peoples of Tircatinga.

The excerpts from the speeches used in the results were identified by the initials of the technique used – Conversation Circle (RC) or Interview (E) – and, subsequently, by letters of the alphabet that distinguish the interlocutors. When necessary, numbers were added to the letters to avoid repetitions.

In accordance with the attributions defined in CNS Resolution No. 510/2016<sup>18</sup>, in CNS Resolution No. 466/2012<sup>19</sup> and in Operational Standard No. 001/2013 of the CNS, the research was submitted to the National Research Ethics Committee (CONEP), under the Certificate of Presentation for Ethical Appraisal (CAAE) No. 36566320.0.0000.8124, and obtained approval under Opinion No. 4,684,527.

## Results and discussion

### SSAN in the Tircatinga Indigenous Territory: Protective and destructive processes

The changes that have occurred around the Tircatinga IL have imposed profound alterations on the way of life of the indigenous peoples, in the interaction between indigenous life and the imposition of various elements of the current capitalist model. Since 2015, with the construction of the territorial and environmental management plan, the Nambikwara, Paresi, Terena and Manoki have been mobilizing to face these challenges, strengthening their political protagonism and promoting actions and initiatives in the context of agribusiness and the works and projects that surround them<sup>15</sup>.

Thus, when discussing territory, health, and food security in conversation circles and interviews, the following were identified as protective processes for SSAN: the territory itself, traditional practices (slash-and-burn agriculture, fishing, gathering, and hunting), food sharing, social programs (retirement benefits, Bolsa Família Program, and basic food baskets), the Thutaliñansu organization, and financial resources from mechanized farming in the IL. Destructive processes included the construction of hydroelectric dams on the Territory's rivers, mechanized farming in the IL, deforestation, the increase in wild animals (wild boar), aerial spraying of pesticides by large farms around the IL, and the ineffectiveness of social programs, as mentioned, because they fail to meet the needs of these peoples in a continuous, adequate, and sufficient manner.

For the indigenous peoples of Tirecatunga, territory is considered a protective process for SSAN, as it provides access to natural resources, including food and water, and confers a sense of belonging and identity, where their ways of life and traditions are practiced. For these peoples, territory is not merely a geographical space, much less private property or a commodity, as is the capitalist society's view of land. Based on this understanding, land is equivalent to capital because it appreciates in value without directly applied labor. This conception differs from that observed in informal conversations with one of the participants in the discussion groups.

*[...] it is from our territory that we define ourselves as our people. Because it is within this territory that we maintain our practices, right? We have our culture, for example, the festivals. [...] We have our food, which are the fish, the pigs, that we eat a lot there [...] it is within our territory that we produce our handicrafts. [...] It is within that we have this interconnection with the animals, right? So it [the land] is our life, it is our home, it is our hearth, it is everything that makes us who we are. So, if we don't have the territory, we also don't have our existence. So, it defines our existence,*

*right? This territory. So, it is of great importance to us [...]* (RCC1).

The territory, therefore, relates to the autonomy of the people who live in Tirecatunga, to cultural diversity and ancestral wisdom, a concept that refers to food sovereignty. The relationship built with the territory guarantees the production of culturally appropriate and ecologically sustainable food, allowing the construction of a food and agricultural system distinct from that propagated by large food companies and corporations.

For indigenous peoples, territory constitutes a spiritual and cultural link to their lives, in addition to providing a sense of identity, as they belong to it and feel responsible for its well-being<sup>20</sup>. For the indigenous people who live in Tirecatunga, the territory is not just a physical space; it is the place where they express their culture, a space of resistance and social identity. It is seen as a sacred space of spiritual connection, where nature is not a resource, but a living entity that nourishes and protects the physical and spiritual health of these indigenous peoples. Despite being subjected to 500 years of colonization, marked by the imposition of the logic of capitalism, individualism, consumerism, and productivism, the accounts show that the peoples of Tirecatunga still fight and resist in order to organize their cultural and social life around the concept of 'good living'. For Acosta, 'good living' is based on harmony and solidarity between human beings and nature<sup>21</sup>.

The Tirecatunga territory suffers constant pressure from the overwhelming and exclusionary mode of production of agribusiness, a concrete expression of the general dimension; thus, the indigenous people see agribusiness as a destructive process and mention in their speech deforestation, the construction of hydroelectric dams, and the aerial spraying of pesticides as processes that cause the deterioration of the guarantee of sovereignty and of SSAN, both in the quantity and quality of food. In this sense, it is important to remember that,

when considering only the quantity of food, the mercantile and industrial perspective of agribusiness on a general scale may favor the reduction of food prices, but at the cost of the deterioration of the food itself and the lands where it is planted, which does not guarantee food sovereignty<sup>22</sup>.

According to the Tirecatinga indigenous people, the deforestation caused by the large soybean and cotton farms surrounding the Indigenous Territories has affected the region's biodiversity, leading to the extinction of many flora and fauna species and causing an environmental imbalance. They report an increase in the number of wild pigs, which, while a food source for the indigenous people, becomes a destructive process because it prevents the planting of slash-and-burn crops, a method that avoids removing stumps and roots, allowing for rapid regeneration of the area with the formation of secondary forest<sup>2</sup>.

*And the issue of not farming anymore is that [...] today in our territory the wild boar population has increased a lot. [...] families even want to farm, but they end up destroying everything [...]. And they don't come in small numbers, they come in droves, fifty, one hundred, two hundred, three hundred boars. And they wreak havoc. [...] we're going to have to fence off the fields because of the large number of wild boars. They are our food source. We eat them too, but I think the predator, the animal that eats them... I think there's some imbalance in nature... it's not eating much, which is the jaguar, and I think it's not eating them [referring to the wild boar] much, so it's very, very strong (RCC1).*

Although the situation described regarding wild pigs may seem new, this context is the result of a long process of colonization and exploitation of the environment and indigenous peoples. When a predatory mode of production is introduced, such as agribusiness, extractive activities, and/or mining, along with changes in the lifestyles of indigenous peoples, a disruption in the food chain cycle is observed within an ecosystem, a disruption of the 'social

metabolism'<sup>14</sup>. These activities, which act as superpredators, result in the reduction of indigenous territories and the indiscriminate consumption of natural resources. This leads to the destruction of forests, as well as:

[...] the loss of biomass from biomes, the reduction of native vegetation cover and the consequent imbalance of biogeochemical cycles, climatic conditions and the loss of sociobiodiversity<sup>23(120)</sup>.

At the same time, there is a change in subsistence activities, thus compromising the food security of indigenous peoples<sup>24</sup>. Hunting becomes less frequent, resulting in greater survival of wild pigs, which seek out the fields to feed, since their habitat and natural food sources for various species, including wild pigs, have been eliminated.

In 2003, Busatto<sup>25(29)</sup> already pointed out that the agricultural production method implemented around the Tirecatinga IL "was based on the elimination of biological diversity, through the imposition of a limited and controlled number of specific, highly profitable monocultures". In the course of this process, the summary destruction of the local natural environment took place. Between 2000 and 2017, there was a significant expansion of deforestation in the Juruena sub-basin: while outside the Indigenous Territories deforestation was 13%, within them, deforestation occurred at 2%, indicating the preservation of native vegetation cover in these areas, with an average temperature 1.5 °C lower than in other locations in the basin<sup>26</sup>.

In Tirecatinga, Indigenous peoples depend on the preservation of native vegetation cover and water to maintain the practice of agriculture, hunting, fishing, and gathering, seen as protective processes for self-sufficiency, within the particular dimension. However, according to an indigenous person's account, deforestation and the use of pesticides in the region hinder these practices and have repercussions on the way of life and the ability of indigenous peoples to subsist exclusively through traditional practices:

*I think that if today [...] I had to live only off of that [referring to hunting and fishing], I don't think I could survive anymore. There's still something, right? Some hunting, but it's very, very rare because of deforestation, right? And I believe it's because of this deforestation, because of the poison they spray on the crops, because the animals, whether they like it or not, eat the crops that are planted in the fields. [...] for example, the tapir, deer, and even the pig, they eat crops that are planted in mechanized farming. And we know that a lot of poison is used on what is planted in mechanized farming (RCM1).*

This statement reveals the complexity of the conflict between traditional ways of life and the pressures exerted by the agribusiness production model, which constantly challenges indigenous peoples to rethink their ways of life and their SSAN. For this to happen, it would be necessary to implement effective public policies for environmental protection (including control of the trade and use of pesticides) and territorial protection, as well as guaranteeing the right of access to natural resources, often denied by infrastructure projects implemented in the region, such as small hydroelectric power plants (PCHs). Respect and appreciation for the cultural practices of these peoples are also necessary, along with incentives that promote sustainability.

The Brazilian State, however, has historically implemented economic policies favorable to the agricultural production model geared towards agribusiness and the export of commodities, which privilege the interests of large corporations to the detriment of small farmers, indigenous peoples, and quilombola communities. The economic elites of agribusiness use their wealth and political power to influence public policies for their own benefit. In the National Congress, the prominent presence of the Parliamentary Agricultural Front, known as the rural caucus, represents the interconnection between economic power and the political sphere, directly impacting the decisions and direction of the country's agrarian policy<sup>6</sup>,

which has repercussions on the particular and unique dimensions of indigenous peoples, quilombola communities, riverside dwellers, among others.

Considering the context of the occupation of the state of Mato Grosso by agribusiness (general dimension), the Growth Acceleration Program (PAC) foresees several projects, including the construction of hydroelectric plants to solve the electricity shortage in the region<sup>27</sup>. Farmers end up using this program to boost the construction of small hydroelectric plants to supply farms and irrigate some crops<sup>26</sup>.

The construction of these power plants profoundly impacts the way of life of indigenous peoples, resulting in the deterioration of access to and quality of water. Indigenous people mentioned the construction of PCHs on the two rivers that delimit their Indigenous Territory as a destructive process for SSAN and a cause for concern regarding the future of the peoples who live there.

*[...] And there's also a lot of growth in hydroelectric dams, right? [...] But we know that the impact on nature is huge. So, through the government, it creates this insecurity for us who live in the territory, which is worrying, right? And we know that perhaps in the future, the trees and rivers that we see today, perhaps our grandchildren, the next generation, perhaps, won't see them anymore, right? It's because of man's own greed, it ends up being destroyed, right? (RCR3).*

Studies indicate that the agribusiness production method uses a large amount of water throughout its production process, which can lead to a decrease in the volume or even the depletion of rivers and groundwater<sup>28,29</sup>, as well as transformations in the ecosystem and in the sociocultural and economic dimensions of riverside communities<sup>30</sup>. This has also been occurring in the vicinity of the Tirecatunga IL:

*It's during this [dry] season, so, what happens? They draw water from the river, and then they irrigate the crops. So it's all the time, all the time.*

*There's no stopping there. They plant one, harvest that one, and then plant another one on top of it, because they have irrigation in their fields (RCM1).*

Thus, we observe the expropriation of a natural resource (river water) and a good considered public (water), without due control by the National Water and Basic Sanitation Agency (ANA), which defines specific rules for water intake from rivers, lakes and springs, in order to comply with environmental obligations<sup>31</sup>. The situation is further aggravated by the enactment of Law No. 14,701/2023 (even if unconstitutional), which provides for the recognition, demarcation, use and management of ILs, allowing water exploitation, expansion of the road network, exploitation of energy alternatives, prospecting and mining in Brazilian IL, regardless of consultation with the indigenous communities of the regions or the National Foundation for Indigenous Peoples (FUNAI)<sup>32</sup>.

The results of the II Food and Nutritional Security Surveillance and Monitoring System (VIGISAN) indicate that food security depends on water security and requires specific supply policies and structural policies to combat climate change, protect water resources, and regulate the use of water sources<sup>33</sup>.

The strategies for usurping indigenous territory are multiple. In the case of Tirecatinga, the expansion fronts promoted by the federal government in the 1970s boosted the primary economy and the flow of agricultural production, attracting workers, generating housing demand, fostering local commerce, and the creation of the city of Sapezal. In this process, there was the delimitation of indigenous territories, allowing the remaining lands to be used by agribusiness and in the production of commodities; conflicts and deaths for the appropriation of lands as private property; incentive policies and tax exemptions for large producers; attempts to insert indigenous peoples into the market economy; and now the expropriation of water through hydroelectric dams.

In Tirecatinga, water is not just a source of consumption; it has cultural value. In the specific domain, the indigenous people use the water for bathing, leisure activities, fishing for subsistence, feeding livestock and wildlife, and they consider certain points of the river sacred. Therefore, the impacts caused by the construction of PCHs have a much broader and more significant effect, far beyond the food security and sovereignty of these peoples.

These projects, stemming from 'development' policies (general domain), are opposed to the possibility of implementing sustainable development, with the negative impacts being paid for by the environment and by the indigenous population that lives there – and which finds itself in a vulnerable situation due to the imposition of national policies that end up benefiting agribusiness. These policies negatively impact the specific domain by reducing access to natural resources such as water and fishing, which are essential to guarantee food security in the villages. Capitalism, in its most predatory form, operates on different fronts that progressively weaken the structures of peripheral societies and deplete their natural resources (water, fauna, flora, soil). Its actions are sometimes explicit; at other times, they manifest themselves subtly and covertly. Thus, it weaves a complex web of domination in multiple directions, difficult to overcome.

Regarding the financial compensation offered during the construction of hydroelectric plants in the territory, fish ponds were installed in some villages, but these did not guarantee continuous and quality access to fish for the entire community and affected the social organization of the men.

*[...] because today there is a lot of impact around us, from the rivers, mainly from the power plant, the power plant comes and builds there, pays compensation to the indigenous people. Gives things to the indigenous man, [...]. And it's mainly impacting the social organization of the people. That's the main impact I see, and what makes me very sad, from these power plants is the impact on their*

*organization. [...] I don't eat much of these fish from the tank, I prefer from the river. Because I don't know what those feeds are like, they already come with a lot of things in them, right? They already come with a lot of chemicals, a lot of things in the feed, the fish already have a lot of things in there, it's not a healthy thing (EC1).*

In a way, the construction of these tanks represents a change in the community's relationship with the environment, since obtaining fish from rivers for food required only the management of traditional fishing practices (individual or collective). With the tanks, the dynamics change, and the transition is permeated by the need to learn new work skills, such as the proper feeding of the fish, the maintenance of water quality in the tanks, and the entire management process, which are not part of their traditional practices. Despite the training offered to the indigenous people, maintaining fish farming in the village requires considerable financial resources. These resources are necessary for the acquisition of broodstock, the purchase of feed for raising and fattening them, the purchase of equipment for handling the fish, and the monitoring of water conditions, which may have been one of the factors that negatively impacted the continued operation of these tanks in the villages. Fifteen fish tanks were installed, but in 2023, only two were operational.

Another destructive process mentioned by the Tirecatunga indigenous people is pesticides. The drift from aerial pesticide spraying from large farms around the IL makes harvesting and slash-and-burn farming impossible (loss of crops). The indigenous people mention concern and sadness, mainly regarding the possible contamination of water and fish, which can impact food and nutrition security, since fish, in addition to being an important food for the body because it is rich in protein and has micronutrients necessary for the diet, is also part of some cultural traditions of these peoples<sup>25</sup>.

*[...] Our village is very close to the farmland and the river, right? When it rains, the water also flows down there, it's a low-lying area, and it all falls into the river from the farmland, and then those pesticides come down, polluting all the water with poison [...] Many times we see the containers in the water, and that's what worries me a lot [...] I even think: why are our farmed fish dying? Maybe because of this dirty water that falls into the ponds, that's what worries me (RCL1).*

Besides fish, other animals, such as armadillos and rheas, which are part of the diet of the indigenous people of Tirecatunga<sup>25</sup>, are affected due to the contamination of water puddles by pesticides or by the consumption, by these animals, of leaves from monoculture plantations. In this sense, the quality of the meat of these animals is a constant concern in their conversations.

*[...] I've seen a lot of very skinny armadillos on the road. Why? They drink poisoned water from the road, right? Because it's the only water they can find to drink, [...] the big puddles in the fields are certainly poisoned, and the armadillo, the animal, goes and drinks it and is already contaminated. [...] we are worried about this, because we still use food from nature [...] Like an armadillo itself, we use the meat of the rhea, we use it for consumption. So it's worrying, and we don't know what that animal meat has in it, right? If it's contaminated or not, but unfortunately, many times we eat it to survive, right? So this applies to both animals and water as well, right? (RCM1).*

Aerial spraying of pesticides also affects pequi production and the local economy. Besides being a food source, pequi is an important source of income for families, with the sale of surplus harvested in the Cerrado.

*[...] that's where the pequi fruit comes in, right? When there's pequi, it really helps these needy families, because they pick it, sell it, and there's always a little extra money, right, for those who don't have work [...] (RCK1).*

Reports of a sharp drop in pequi fruit production suggest a link to the use of pesticides (herbicides and insecticides) in cotton and soybean farms.

*Last year we had pequi fruit, pequi loaded in our area. [...] from one day to the next, all the pequi fell to the ground! It wasn't ripe pequi. It was already ripening, and it all fell! We didn't have pequi last year. We didn't eat pequi. Now, why did it fall? I don't think it was due to lack of rain, right? And why did it all fall? We didn't have pequi last year (RCG1).*

Literature has highlighted the intensive use of pesticides in MT<sup>34,35</sup>, including intentional pollution derived from pesticides and its impacts on the way of life of the population in municipalities located near large farms, identifying pollution beyond the farmland area, as well as the surrounding environment<sup>34</sup>. The results of analyses on the presence of pesticides in the waters of Guarani Kaiowá communities in Mato Grosso do Sul identified the presence of 22 Active Ingredients (AIs), with emphasis on:

Fipronil, 2,4-D, Clomazone, Atrazine, Diuron and Simazine. Of the detected AIs, 41% are classified as highly toxic, presenting serious health risks, and 68% of these compounds are banned in the European Union. It is noteworthy that at least one AI was detected in 82.2% of the samples. These results highlight the adverse impacts of the intensive use of pesticides in agricultural commodities, compromising the health and food security of these indigenous peoples<sup>36(1)</sup>.

Beyond pesticide contamination, it is also worth reflecting on the scarcity of food for animals due to deforestation. It is possible to identify, from the statements, the biodiversity crisis. According to Shiva<sup>37</sup>, this crisis is not limited to the disappearance of species, but rather to a crisis that threatens the livelihoods and self-sufficiency of traditional communities, generating inequalities and the domination of colonizing knowledge. According to Breilh<sup>38(19)</sup>,

[...] the current economic model is irrational because it does not allow space for life, and because it generates unhealthy living standards, embedded in a contaminated and declining ecological system.

During the discussions, the ambivalent meaning of the Haytsu mechanized farm in Tirecatinga became evident. Since 2003, the Nambikwara and Paresí people of Tirecatinga have adopted mechanized farming practices on part of their land, focusing on the production of soybeans (main crop) and corn (second crop). When the financial resources from the soybean harvest profits are allocated to the villages and used for food purchases, health treatments and examinations, and/or other improvements, Haytsu mechanized farm is perceived as a protective process. However, the distribution of financial resources from the sale of the harvest generates internal conflicts and impacts social cohesion, traditional forms of cooperation and collaborative alliances, affecting the collective well-being of the indigenous people. In this sense, mechanized farming comes to be seen as a destructive process. According to Viapiana, Gomes and Albuquerque<sup>39(178)</sup>:

[...] there are no inherently protective or destructive processes. It is in their concrete development that processes acquire a protective or destructive character. The same process can even simultaneously trigger protective and destructive effects.

As per the following statement:

*[...] it's bringing disunity into our village, right? One of the things I noticed, a few years ago, well before we started farming, and before these projects, before everything you can imagine coming into our communities, we indigenous people, we were very united. Someone would go to farm, everyone would help, someone would do something, everyone would help. And I remember to this day, there's a guy from FUNAI,*

*his name is [...] he said: I'm going to tell you something, you are very united, you are still united, within the Tirecatunga Reserve, you are united. That's very beautiful, your unity! But when projects come into your communities, you'll see the disunity that will come. And he was right [...] and when these projects started coming in, right? Small hydroelectric power plant, farming for our community, that's how it is, our leaders, our representatives who work on the front lines of the project, and I don't know what they think, because [...] there's a lot of [...] disagreement between us and them, right? Because they do it one way and we see that the way they're doing it is wrong, and you're going to say they don't accept it, they want to do it the way they understand how to do it [...] yes, farming is helping, I'm not going to lie, it's helping the community, [...] but it does need, as I said before, I said it does need good management. That's necessary (RCM1).*

Haytsu farm is a form of collective action by the peoples of the Tirecatunga IL in the face of pressures imposed by coexistence with non-indigenous people, the ineffectiveness of public policies for education, health, and food, and the absence of structural public policies that alter the economic development model based on agribusiness, which prioritizes capital accumulation and commodity production to the detriment of preserving traditional and sustainable ways of life. It is worth noting that mechanized farming in Tirecatunga does not have as its primary objective the accumulation of goods and money, but rather the fulfillment of basic needs that the State should provide. However, it has triggered internal conflicts in Tirecatunga, manifested by divisions between villages and changes in the social organization of these peoples.

This result is similar to the study by Nascimento and Rossetto<sup>40</sup>, which pointed to internal conflict, as well as concerns about the impact on the culture and social structure of the community, with the implementation of mechanized farming in the Paresí

Indigenous Territory, located in southwestern MT. According to the authors, the Paresí economy has faced negative impacts throughout its history. Faced with this situation, they sought to develop economic alternatives:

*[...] several economic alternatives were proposed by indigenous policies in Paresí lands, some of which remained only on paper, others were developed but are now unfeasible<sup>40(6)</sup>.*

Faced with persistent economic difficulties and the failure of indigenous policies, some Paresí people advocated, at the time, the mechanization of agriculture on their lands, opting for partnerships with local producers who provided machinery, inputs, and covered costs, while the indigenous people contributed with paid labor and the land, receiving a percentage of the production. However, the termination of these contracts generated concern, as the Paresí became dependent on this resource as their main source of income.

Regarding access to social policies, the indigenous people point to the receipt of Bolsa Família Program, basic food baskets, and retirement benefits as protective processes for SSAN, since the financial resources allow for the purchase of food and gas in the markets of Sapezal. As destructive processes, they mention the lack of continuity of assistance programs, such as the delivery of basic food baskets, and the ineffectiveness of these programs, which do not meet the real needs of the population:

*[...]Now this donation, this food basket that the government is sending, right? It's not much, but it comes, right? [...] But it's not every day either, it's not every month, right? [...] This comes every four months, I don't even remember the last time it came. [...]. Then the food basket, in the first month of the pandemic, was huge. It's getting smaller. It's getting smaller, right? So for those who have a lot of children, this is no longer enough food to last, right? (RCG1).*

Alcantara and Gugelmin<sup>41(126)</sup> point out that

[...] public policies and implemented programs are shaped by a historical, social and ideological context, which does not always result in significant changes in the social landscape or in the nutritional status of the population.

In Tirecatinga, it is observed that the capitalist system deprives individuals of the ability to produce their own food and places them in a situation of dependence on welfare policies. These programs do not bring about structural transformations in the country's macroeconomy, social organization, agrarian or environmental issues. Thus, they end up assuming a welfare character that produces dependence and increases inequalities, oppression, and subordination.

The complexity of the existing social, historical, and cultural contexts among indigenous peoples needs to be considered in interventions related to education, health, and food<sup>42</sup>. In this sense, basic food basket donations and the Bolsa Família Program are applied without adaptations to the specific needs of indigenous peoples, quilombola communities, and traditional communities.

Elliott et al.<sup>43</sup> mention that, to achieve food security and strengthen access to traditional foods, it is necessary to empower Aboriginal communities, renew family and community relationships, and implement political measures and government regulations in Canada. The authors also mention that the lack of control over land and water use by non-Aboriginal people, environmental contamination, deforestation, and climate change impact access to traditional foods. Furthermore, they indicate that there is little attention paid to these issues in decision-making, underlining the need for Aboriginal political representation in government to implement effective transformations.

Another protective process for SSAN in the IL is the work of a group of Indigenous women in the Thutaliñansu organization. During the pandemic, when famine was widespread, this

organization played a central role in meeting the needs of families by donating chickens for both food and for raising in the villages, given that the State was absent and did not allocate financial resources to Indigenous peoples during that period, highlighting a scenario of neglect and violation of the right to food.

*We didn't have many resources [referring to the association], but we gave up what we had to help that woman who was there in need. [...] We helped many women here. For example, we saw when they didn't have food [...] (RCM1).*

Raising women's awareness of their strength, as they develop mutual support for women and families in vulnerable situations, was an important movement of intentional, autonomous, and transformative action during the pandemic and continues to this day, especially with the encouragement to take courses (crafts, sewing, entrepreneurship) and develop sustainability projects, such as the proposal for sustainable tourism and organic food production within the Tirecatinga IL. These are collective actions developed in the particular dimension that enhance food security and build food sovereignty for the indigenous peoples who live in Tirecatinga. At the same time, it is the recognition of a political 'We' in a multiethnic territory.

The sharing of food among indigenous people was also identified as a protective process for SSAN, and when families linked to the same social group have needs – this practice is present, reflecting reciprocity in its unique dimension. One of the interviewees reports that

*[...] there's always something missing, right? There's always something missing, right? [...] many times it's not just us who consume, but our families come too, we end up sharing, right? So there's always going to be something missing (ER).*

This suggests collective consumption and a widespread network of reciprocity, in which

food is distributed within the family group with the expectation that, at some point, others will also contribute. There is an implicit moral obligation to share, a central element of Marcel Mauss's theory of reciprocity<sup>44</sup>, despite existing material limitations. This sharing alleviates hunger and functions as a mechanism of collective protection, but results in scarcity of certain food items, which affects stability and highlights the challenges faced in ensuring SAN.

In the case of Terecatunga, reciprocity manifests itself in the sharing of food among people with kinship ties. Although there are changes in access to food (mostly acquired in markets in Sapezal), the indigenous people seem to maintain the sharing, mainly of food from the fields/gathering/fishing and hunting, in order to ensure that everyone has access to something, even if it is occasionally lacking. However, this dynamic has been affected by interaction with the city, where exchanges are mediated by money and end up impacting the sale of certain food products within the villages. This situation has been reported among Aboriginal people in Canada<sup>43</sup>.

The sale and/or non-sharing of food with people who are not from the same kinship group, breaking with traditional practices of reciprocity, can be understood as part of the transformation process in the social and economic dynamics of indigenous peoples, directly impacting the sovereignty and the SAN of these peoples, since it weakens traditional access systems, weakens community ties, and increases dependence on external markets, jeopardizing the food autonomy and cultural reproduction of these peoples.

## Final considerations

The article's focus on the protective and destructive processes of SSAN captured the diverse interfaces between economic and cosmological systems that are not directly connected, but coexist in a geographical and temporal space. The discussion ranged from

the position that the indigenous peoples of Terecatunga occupy in the region's productive structure, their relationships with nature and agribusiness, and the repercussions on SSAN. For indigenous peoples, food security and sovereignty are intrinsically linked to the protection of their territories, traditional knowledge, and ways of life.

By using a critical perspective, grounded in the theory of the social determinants of health<sup>16</sup>, it enabled more comprehensive analyses of a complex reality constructed in historical processes, which allowed us to understand the worsening of the food insecurity situation among the indigenous peoples of Terecatunga, based on the destructive process imposed by the agribusiness mode of production.

Even considering both protective and destructive processes, it is clear that, in reality, these processes intertwine and generate the subsumption of the general, particular, and singular dimensions. Thus, thinking about SSAN among indigenous peoples requires an understanding of the historical, social, and cultural processes developed by indigenous peoples who are active agents of their own actions and existence. However, they struggle against powerful forces that undermine their social structures and their environment, in order to guarantee the permanence of unequal relations and the reproduction of capital.

In short, the indigenous people of Terecatunga expressed the following as destructive processes: the large soybean and cotton farms surrounding the Terecatunga IL; the agricultural techniques resulting from this mode of production, including the use of pesticides, especially by aerial spraying; the impacts caused on river waters and the environment; and hydroelectric power plants. Throughout history, Indigenous peoples have relied on nature to ensure their SSAN and existence, and environmental and social changes, as well as the imposition of territorial boundaries, have been understood as destructive processes that interfere with SSAN. The Indigenous peoples of Terecatunga are trying to exist and resist in this context and,

to this end, are building collective actions that protect life and promote SSAN – among them are reciprocity, agricultural production, and the Thutaliñansu organization.

It is necessary to ensure the human right to adequate food and to discuss the hegemonic mode of production established in the country, since this mode of production, imposed economically and politically in Brazil, has negatively impacted indigenous territories, increasing food insecurity among these peoples. In view of this, it is necessary to think about other modes of production that have as their principle the health of the land and the populations, based on an equitable distribution of wealth, the social well-being of the peoples and the sustainable use of natural resources.

The indigenous organization Thutaliñansu plays a fundamental role in resisting the advance of the exclusionary agribusiness mode of production. Furthermore, it has strengthened SSAN through sustainable agricultural practices within the Tirecatinga IL. In addition, there is a need to build and strengthen existing spaces for dialogue and articulation for collaborative strategies between indigenous people, health managers and government representatives. The search for solutions that promote SSAN in indigenous villages reflects not only an immediate need for access to food, but also a commitment to preserving cultural identities and promoting the overall health of these populations.

Despite its contributions to understanding the impacts of agribusiness on SSAN and the sovereignty of the indigenous peoples of the

Tirecatinga IL, the study has some limitations. One of them stems from the reduced time spent in the IL, imposed by the COVID-19 pandemic. This limitation hampered fieldwork, restricting the deepening of interactions with the community and the collection of more comprehensive information.

Regarding the agricultural production model currently in place in the state of Mato Grosso and in Brazil, it requires expanded processes of expropriation of existing natural resources in the region and subordination of indigenous peoples, causing impacts on their reproduction through traditional methods, as pointed out in this article. Food sovereignty remains under constant threat from the expansion of extractive activities, the commodification of nature, and the violation of territorial rights. The right to adequate food is inseparable from the right to traditional territories. Thus, guaranteeing indigenous food sovereignty and security requires structural and intersectoral political transformations that combine land demarcation, support for traditional agricultural practices, and the effective participation of these peoples in the construction of food policies that incorporate cultural, environmental, and economic aspects.

## Authorship contributions

Reis AFC (0000-0003-2674-4457)\*, Gugelmin SA (0000-0002-4818-1344)\* and Corrêa MLM (0000-0001-7812-0182)\* contributed equally to the preparation of the manuscript. ■

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